

Rural Livelihood Benefits from Participation in the Taungya Agroforestry System in Ondo State of Nigeria

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This study examines the strategies and benefits of the taungya farming system to both the government and the rural economy in Nigeria. An interview survey was conducted in which data were collected from 115 randomly selected farmers in five villages in the Oluwa forest reserve, Ondo State, Nigeria. The study examines the extent of participation of rural dwellers in plantation development through taungya farming and the degree of success of this system as an afforestation method. The farmers were predominantly illiterate, within the age bracket of 35-54 years and with small farm holdings. Twenty nine percent relied totally on food from the forest reserve for their livelihood, while 71% also had farm holdings in free areas. Land within the reserve is allocated to farmers free of charge but compensation is paid to landlords on land from free areas. A statistically significant difference was detected in income from the two sources of farmland for the households and but not in the size of land allocated under taungya and free areas. About 184 farmers are involved in taungya annually, and 410 ha of *Tectonia grandis* has been established for the government of Ondo State.

Keywords: taungya, afforestation, arable crops, sustainable livelihood, compensation

INTRODUCTION

Nigeria covers a land area of about 983,213 km² of which one-third is classified as forest (Ogunlade 1993). The area of natural vegetation in Forest Reserves (about 96,061 km²) is continually diminishing due mainly to conversion to agricultural uses. The rate of deforestation in the high altitude forest zones has been estimated to be 5150 km² per annum (NEST 1991). The forest reserves have diverse vegetation types that may be broadly divided into savannah and rainforest. Savannah in the northern part of the country occupies about 78% of the total forest reserve while rainforest (including swamp land) accounts for only 2% and constitutes the primary source of timber supplied (FAN 1989).

The rapid population growth in Nigeria (2.5 – 3% per annum) has increased the pressure on forestland as a source of farmland and also on forest products and services. Another major cause of deforestation in Nigeria has been the traditional shifting cultivation and bush fallow system practiced in many parts of the country.

Due to shortage of land and increasing population pressure, shorter fallow periods are being adopted by farmers, reducing the efficiency and sustainability of this practice (Oke 2002). The only remedy to the removal of natural vegetation and the environmental problems caused by these principal agents of deforestation is the establishment of more plantations and improvement in the management of natural vegetation.

To increase the volume of wood available for consumption, the government initiated various afforestation projects, and various arms of the government have raised many hectares of fast growing exotic and indigenous species. Prominent among these species are *Tectona grandis*, *Gmelina arborea*, *Cassia spp.*, *Pinus carileca*, *Eucalyptus spp.*, *Nauclea didderichi*, *Tripplochiton scleroxylon* and *Terminala spp.* The cost of establishment and maintenance of these plantations is so high that only the government can undertake afforestation. Cost therefore is a major impediment to community participation in tree planting, the initial capital investment on plantation establishment being beyond the reach of rural communities. Other limitations are the long rotation period of tree species and government policies that discourage logging. Introduction of the taungya system of afforestation has allowed farmers to take part in plantation development at little expense. The cost of establishment and maintenance is shared by them and the government. This paper reports survey evidence on the socio-economic benefits of taungya farming system to rural dwellers and its contribution to afforestation programs.

THE STRATEGIES OF TAUNGYA SYSTEM

Agroforestry practice has become a way of livelihood to farmers in Nigeria. Taungya is an agroforestry practice whereby forest trees and agricultural crops are raised simultaneously on the same piece of land. It is primarily aimed at plantation establishment. The term 'taungya' was first used in Burma, where it is believed to have originated, to describe the system and means literally 'hill cultivation' (King 1968). It was introduced in Nigeria in 1927 by the silviculturist Kennedy in his experiment of regeneration of tropical rainforest at Sapoka, Edo State.

Two types of taungya system are employed. One entails the allocation of forestland to be regenerated to farmers by the Forestry Department. Committed farmers are often selected from a list of applicants, and tree seedlings to be planted are produced by the Forestry Department and distributed to the farmers free of charge. The farmers are expected to carry out site preparation, and to plant under the supervision of Forestry Officers. Maintenance of the trees along with their interplanted food crops for a specific numbers of years (about three years or until the trees begin to close canopy) is also the duty of the farmers. After this period, each participating farmer is expected to vacate the plot, and the Forestry Department takes over the maintenance of the trees. The crops belong to the farmers while the trees belong to the government and are protected by a set of rules; any farmer who fails to obey the rules guiding the operation of the system faces the risk of being ejected from the scheme and the reserve.

The other type of system is referred to as 'Departmental Taungya'. Under this practice, the Forestry Department owns both the crops and the trees. Instead of

allocating the land to farmers, forestry staff are usually engaged in planting and maintenance of crops and trees together.

BENEFITS OF TAUNGYA FOR SUSTAINABLE LIVELIHOOD

Taungya has been seen as a promising technique to achieve sustainability in land use and as a means of meeting the need for land by the rural population. Shortage of food is one of the greatest problems facing many Africans. In Nigeria, farmers are faced with insufficient cultivation land, lack of credit facilities and lack of modern equipment and agrochemicals for farming. As a result, many can produce food only for family members, with little left for sale. Taungya has gone a long way to improve the socio-economic life of the rural sector of the economy and is a means of increasing food supply.

Adegboye and Famoriyo (1975) noted that two-thirds of all land holdings in Africa are under 2 ha. Further, Ondo State farmers have small land holdings which are fragmented into plots (Adekunle 1999), and the distance between these plots makes accessibility cumbersome. So, an abundance of landless farmers, the land tenure system, unemployment and the availability of fertile land under existing forest, are the factors behind the successful operation of the taungya system in the State. Also, multiple land-use conflicts, problems of land hunger and pressure on forest reserves for farmland are solved through its adoption.

Enabor (1978) noted that the taungya system ensures complete utilisation of forest soils and improves the economic welfare of the peasant farmers. Taungya creates room for communities to participate in afforestation programs, provides employment opportunities and has been reported to reduce the cost of afforestation by up to 58% (Enabor 1978). Ball (1981) reported that over 17,700 farmers were engaged in taungya farming in Sakpoba in 1971 and 24,500 in 1975. He estimated yield per hectare at 1.2 metric tons (mt) of maize, 15.0 mt of cassava and 8.0 mt of yam. He noted also that 18,000 ha of forest reserves were farmed and planted up with trees by participating rural communities in 1981.

In the old Ondo state (before its bifurcation in 1996), there were 800 taungya farmers in three conservancies (MANR 1991). Ogunlade (1993) reported that in order to achieve one of the objectives of the Ondo state afforestation project (increased food production for rural livelihood), 700 farmers were allowed to farm in parts of the cleared area annually.

Many authors have reported on the potential of the forest ecosystems for the supply of many goods and services to the rural communities where the taungya system of afforestation is being practiced. ODSEPA (1999) identified about 150 indigenous woody plants from native forests as yielding edible products for man and livestock. Akachuku (1997) listed some of the wild indigenous fruits that are harvested and consumed either raw or cooked. Buongiorno *et al.* (1994) and Peters (1996) reported that many rural dwellers depend on the use of non-timber forest products for their livelihood.

METHOD OF DATA COLLECTION AND ANALYSIS

The study was conducted in the OA7 Forest Reserve (Oluwa Forest Reserve) in Odigbo Local Government area of Ondo state. This reserve was selected because of the presence of an active and successful taungya program. Five villages (four enclaves and one outside the reserve) were randomly selected for data collection, namely Asejire, Yegunwa, Ominitu, Onimole and Aba-tuntun.

Data were collected with structured questionnaires administered to 25 farmers engaging in taungya from each of the five villages. The questionnaire was designed to collect information about household size (and supply of labour for farm work), sizes of farms under taungya and those outside the forest reserve, amount realised annually from sale of crops from taungya and non-taungya farms, other sources of farmland, and compensation paid to landlords for rented lands. The questionnaire was drawn up in English and translated to the Yoruba dialect so that it could be understood by the farmers, especially those without formal education. The farmers were visited individually for interviewing in their communities, and most questionnaires were retrieved on the spot. A total of 115 usable responses were obtained. The data have been collated and summarised using an Excel spreadsheet. The total household income from respondents' major occupation (farming) was estimated by adding the income from taungya farming and from crops in free areas.

FINDINGS FROM THE SMALLHOLDER SURVEY

The majority of the respondents (71%) fell within the age class of 35 – 54 years, which is within the active age of the working class in Ondo State. These people are usually heads of the household and breadwinners. They are actively involved in taungya farming as a means of livelihood. Those within the age of 35 – 54 years can still witness the harvest of trees they plant and benefit personally from these trees. Even though the trees belong to the government, opportunities exist for the men to become forest concessionaires, and take part in logging and transportation. Opportunities also exist for the women to be involved in collection of leaves for wrapping, gathering of firewood for domestic cooking and collection of some non-timber forest products from the reserves. These items are obtained for household consumption and sales. The communities also gain some environmental benefits provided by the plantations. These include watershed protection, windbreaks, erosion control and climate amelioration. It is possible for this set of people to benefit maximally from the trees planted by them because the prominent species adopted (*Tectona grandis*) is a fast growing exotic species with a harvest age of 15 – 20 years. Seventeen percent of respondents were aged between 20 and 34 years and 12% were 55 years and above. The latter group would have difficulty coping with the physical demands of taungya farming, and in general do not believe in tree planting.

All respondents had been involved in taungya farming for about six years, and had gained considerable experience in the practice. About 90% had no formal education, while 3% and 7% had primary and secondary school education respectively. Those with higher levels of education tend to migrate to urban centres for white-collar jobs.

Table 1 reports household sizes of the farmers practicing taungya farming in Compartment OA7 forest reserve. The most common household size is between six and eight people (46%), followed by nine to eleven persons (32%). The large number of people in the household of rural farmers is for the purpose of providing labour for farm activities. Taungya farming is labour intensive, and as a result more hands are needed than for traditional farming systems. Lowe (2003) noted that women were not commonly allocated land because they have difficulty with the heavy work but they normally help their husbands. As the men are busy with land clearing, ridge making and weeding, the women usually cook for those who are working on the farm, and gather firewood and other non-timber forest products essential for their livelihood. The women also carry out assignments considered not to be labour intensive, such as transferring of planting materials to the site and planting.

Table 1. Household size of taungya farmers in Compartment OA7 of Oluwa forest reserve (n=115)

Household size (no. of persons)	Frequency	Proportion (%)
3 – 5	6	5
6 – 8	53	46
9 – 11	37	32
12 – 14	19	17
Total	115	100

About 71% of respondents operated farmland outside the forest reserve (i.e. in the free areas) to supplement income from the taungya farm. The farmers were allocated 1 – 4 ha of land by government agents (foresters) free of charge in the reserve, and were required to follow specific rules, in particular they were not permitted to exploit timber or other forest products, set the forest on fire, neglect care for the tree component (in favour of their crops), or destroy or damage the trees. Also, they were required to quit the land at expiration of their term as specified in the agreement. The farm size of the farmers as shown by Table 2 reveals that 58% have their farm size of 1 – 2 ha and 42% have a farm size of 3 – 4 ha allocated to them in the forest reserve for taungya farming. The maximum size of land that can be allocated to an individual farmer under this scheme is 4 ha. In the free areas, 87% of the farmers have their farmland size in the range of 1 – 2 ha while only 12% have a farmland size of 3 – 4 ha. The total area of respondents' farmland is 409.5 ha (268.5 ha under taungya and 141.0 ha of free area). The average area operated under taungya is 2.33 ha while that in the free area is 1.72 ha. A paired-sample t-test was applied to differences in area of forest reserve land and free land held by farmers and was significant at the 1% level.

Table 2. Farm size of taungya farmers in the reserve and free areas (ha)

Size (ha)	Forest reserve		Free area	
	Frequency	Percentage	Frequency	Percentage
1 – 2	67	58	71	87
3 – 4	48	42	10	12
5	0	0	1	1
Total	115	100	82	100

These findings indicate that the farmers are predominantly small farm holders, a consequence of shortage of land for agriculture and difficulty in securing tenure. Land acquisition under the land tenure system in southwest Nigeria where this study was conducted is usually by inheritance, purchase or lease. The major problems of land tenure system are unequal distribution of land among the respondents, small land holding and landlessness. Those that are landless rely on the Forestry Department for regular supply of farmland in the forest reserve under this system.

While a combination of arable and permanent (tree) crops is possible in free areas, farmers under taungya can grow only arable crops. Frequency distributions of annual value of sales for the taungya and free areas are reported in Table 3. The average revenue from crops under the taungya system was ₦ 59, 974.03 while the average revenue from sales of farm output from free areas was ₦ 72,975.60¹. Prominent among these arable crops are yam, cassava, maize and plantain. A paired-sample t-test on the ungrouped data indicated a significant difference at the 1% level for average farm revenue from sales of products harvested from taungya farms and non-taungya farms.

Table 3. Amount realised from the sale of crops from taungya farms and free areas

Amount (₦)	Forest reserve		Free area	
	Frequency	Percentage	Frequency	Percentage
10,000 – 30,000	2	1.7	8	10
30,000 – 60,000	70	60.9	17	21
61,000 – 90,000	39	33.9	35	43
91,000– 20,000	3	2.6	7	8
> 120,000	1	0.9	15	18
Total	115	100	82	100

Table 4 shows the sources of additional farmland for the 82 respondents operating land in both the reserve and free areas. The highest number (61%) rented land for farming while 30.5% used family land. Only 8.5% had access to community land.

¹ The Naira is the unit of Nigerian currency. ₦120 = US\$1 approximately.

Table 4. Sources of other farmland in the free areas to respondents in the study area

Source	Frequency	Percentage
Family land	25	30.5
Rented land	50	61
Community land	7	8.5
Total	82	100

While lands were allocated freely to taungya farmers in the reserve, payment for use of farmland from other sources was found to be either in cash or in kind as compensation to landowners. Seventy seven percent of the farmers fall into the category of those that pay fixed annual cash rentals to landlords (Table 5). Other methods of payment as shown by this table are in kind with fixed rate (20.7%) and share of crops (2.5%).

Table 5. Payment on land from other sources by the respondents in the free areas

Payment	Frequency	Percentage
Cash rent fixed rate	63	76.8
Cash rent in kind	17	20.7
Rent, share of crops	2	2.5
Total	82	100

DISCUSSION

The survey results indicate that the taungya system has been successful in the study area as a means of plantation establishment and that many farmers are willing to be involved. The system enables the contribution and participation of rural farmers in plantation development. Most of the farmers are sufficiently young and fit to cooperate with the Forestry Department to plant and maintain the tree seedlings. These farmers have been in taungya farming since the inception of the system in Compartment OA7 of Oluwa forest reserve in 1996. An average of 184 farmers are allocated land annually, and they have established an aggregate area of about 410 ha of *Tectona grandis* in the reserve between 1996 and 2002. Taungya has the potential for creating employment, increasing food production and enhancing the provision of rural infrastructure. All these will improve the socio-economic status of the rural communities (characterised by illiteracy, abject poverty, malnutrition, diseases, a weak land tenure system and lack of rural infrastructure), prevent rural-urban migration with its associated problems and guarantee forest sustainability.

There are other benefits identified by this study as accruing to the farmers in the reserve. All the respondents claimed to depend on the forest for their sustenance. This includes collection of herbs which are either concocted or decocted to cure various ailments, hunting, firewood collection for domestic cooking, collection of poles and stakes and gathering of non-timber forest products (snails, mushrooms, fruits and chewing sticks). The services provided by the trees for the immediate

environment are as a recreation site, soil conservation, shelter from wind, soil erosion control and watershed protection.

This study shows that taungya, one of the existing agroforestry practices with its symbiotic roles, has the potential of afforesting degraded forest reserves through plantation establishment. If the two parties involved are faithful and committed to the rules guiding the operations of the system, it is an easy means of tree regeneration. It allows food production by landless farmers and adds to their per capita income. To make it more effective, government needs to do more than allocate and distribute seedlings, leaving the farmers to do the pre-planting and planting operations. The Government should contribute to clearing and also provide incentives to the farmers for taking care of the trees until canopy closure. The incentives may be in the form of cash advance and supply of farm inputs, such as fertiliser and herbicide. In the Departmental Taungya system, the possibility of illegal activities by farmers is removed, since only forestry staff are involved.

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